

DESCRIPTIONS OF FIVE NEW RAINBOWFISHES (MELANOTAENIIDAE) FROM NEW GUINEA

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ABSTRACT

A collection of freshwater melanotaeniid fishes taken on an expedition to Dutch New Guinea (now Irian Jaya) by the Rijksmuseum van Natuurlijke Histoire (Leiden, Netherlands) during 1954-55 was studied. It contained four new species which are described herein: *Melanotaenia ajamaruensis* (Ajamaru Lakes, Vogelkop Peninsula), *M. boesemani* (Ajamaru Lakes), *M. japenensis* (Japen Island), and *Glossolepis pseudo-incisus* (Tami River, Djajapura district). An additional new species, *Melanotaenia oktediensis* is described on the basis of three specimens collected by the Smithsonian Institution (USA) and Papua New Guinea Fisheries Department from the headwaters of the Fly River System, southern Papua New Guinea. The five new species are described in detail, illustrated, and compared with allied species.

INTRODUCTION

Rainbowfishes of the family Melanotaeniidae inhabit freshwater streams, swamps, and lakes of northern and eastern Australia and New Guinea. The family contains nine genera and approximately 40 species (Allen, in press). All of these are small fishes, usually under 15 cm standard length, dwelling primarily in fresh water. Because of their diminutive size they are commercially unimportant, although they are eaten, usually dried, in some villages of New Guinea. Several species, primarily from Australia, are esteemed as aquarium fishes because of their attractive colours and ease of breeding in captivity.

The senior author is currently engaged in the study of melanotaeniids, with plans for an overall revision in the near future. In connection with this work specimens were examined at European museums during 1975 and 1977. A particularly valuable collection was brought to our attention by Dr M. Boeseman, Curator of Fishes at the Rijksmuseum van Natuurlijke Histoire of Leiden in The Netherlands. This collection was made by Dr Boeseman and colleagues during 1954-55 at numerous localities in Dutch New Guinea (now Irian Jaya). They are of particular interest, because this region is the most

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Map 1—Collection sites for new species of melanotaeniids: 1—Ajamaru Lakes (*Melanotaenia ajamaruensis* and *m. boesemani*); 2—Japen Island (*M. japenensis*); 3—Tami River (*Glossolepis pseudoincisus*); 4—Ok Tedi River (*M. okrediensis*).

poorly collected of all the areas inhabited by melanotaeniids. Four new species from this collection are described herein. The other species will be treated in a later publication. The fifth species described in this paper first attracted our attention when it was reported as *Melanotaenia* cf. *vanheurni* by Roberts (1978) in his survey of the fishes of the Fly River System. Our subsequent examination of the single specimen obtained by Roberts and two others from the Papua New Guinea Fisheries Department form the basis of the description of this species.

We have deposited type specimens of the new melanotaeniids at the following institutions: Lembaga Biologi Nasional, Bogor, Indonesia (LBN); Kanudi Fisheries Research Laboratory, Port Moresby, Papua New Guinea (PNG); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); U.S. National Museum of Natural History, Washington, D.C. (USNM); and Western Australian Museum, Perth (WAM).

Data in parentheses in the descriptions below apply to paratypes when different from the holotype. Additional counts and measurements are summarised in **Tables 1-7**. Proportions are expressed as percentage of the standard length.

Standard length (SL) is taken from the most anterior point of the upper lip to the midbase of the caudal fin (end of hypural plate). Head length is measured from the front of the upper lip to the end of the opercular membrane. The depth of the body is the maximum depth from the base of the first dorsal fin. The diameter of the eye is the horizontal fleshy diameter. The interorbital width is the bony width. The depth of the caudal peduncle is the least depth. The length of the caudal peduncle is the horizontal measurement connecting two vertical

lines, one passing through the base of the last dorsal ray and the other through the base of the middle caudal rays. Predorsal, preanal, and prepelvic distances are measured from the snout tip to the base of the spine at the origins of the first dorsal, anal, and pelvic fins respectively. Predorsal scales are counted on the dorsal mid-line between the origin of the first dorsal fin and the interorbital. Preopercle scale counts refer to the total number of scales overlying the preopercle bone. Pectoral ray counts include the tiny, rudimentary lowermost rays. Gillraker counts include rudiments; the raker at the angle was incorporated into the lower-limb count.

The collection sites for the new species are shown in Map 1.

SYSTEMATICS

Melanotaenia boesemani sp. nov. (Fig. 1)

Holotype

RMNH 28061, male, 66.3 mm SL, collected at Ajamaru Lakes, Vogelkop Peninsula, Irian Jaya, Indonesia (approximately 1°21'S, 132°16'E) by M. Boeseman on 4 March 1955.

Paratypes

LBN 2487, 3 specimens, 49.5-63.4 mm SL, collected with holotype; RMNH 28062, 27 specimens, 35.0-63.0 mm SL, collected with holotype; RMNH 28063, 9 specimens, 35.6-61.3 mm SL, same data as holotype except collected on 3 and 4 March 1955; RMNH 28064, 7 specimens, 31.9-52.5 mm SL, collected at

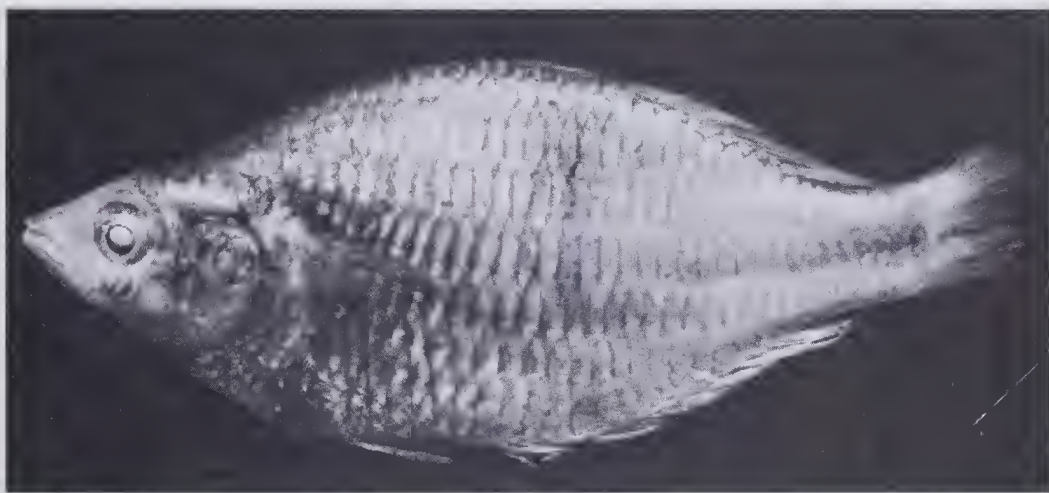


Fig. 1—*Medanotaenia boesemani*, holotype, 66.3 mm SL.

Djitmau, about 3 km south of Ajamaru Lakes by M. Boeseman on 7-9 March 1955; RMNH 28065, 3 specimens, 27.3-49.3 mm SL, same data as holotype except collected on 3 March 1955; RMNH 28066, 3 specimens, 54.0-56.0 mm SL, collected at Aitinjo Lake, approximately 20 km SE of Ajamaru Lakes by M. Boeseman on 12 March 1955; RMNH 28067, 6 specimens, 41.7-86.5 mm SL, same data as holotype except collected on 4-6 March 1955; USNM 220904, 3 specimens, 46.8-53.2 mm SL, collected with holotype; WAM P26791-001, 3 specimens, 49.5-63.4 mm SL, collected with holotype.

Diagnosis

A species of *Melanotaenia* with the following combination of characters: dorsal rays IV to VI, 10 to 14; anal rays I, 17 to 23; pectoral rays 13 to 16; horizontal scale rows 7 or 8; vertical scale rows 32 to 37; predorsal scales 14 to 16; preopercle scales 7 to 15; anterior one-half to two-thirds of body overall purplish-brown, posterior portion yellow or tan (red-orange in life), sometimes with two or more diffuse dark bars on lower half of anterior body region.

Description

Data for counts and measurements are based on the holotype and 41 paratypes, 44.3-86.5 mm SL.

Dorsal rays IV-I, II (IV to VI-I, 10 to 14); anal rays I, 18 (I, 17 to 23); pectoral rays 16 (13 to 16); horizontal scale rows 7 (7 or 8); vertical scale rows 35 (32 to 37); predorsal scales 16 (14 to 16) (\bar{x} = 15, N = 59); preopercle scales 10 (7 to 15) (\bar{x} = 11, N = 60); gill rakers on first arch 2 + 15 (2 to 4 + 14 or 15).

Greatest body depth 43.6, greatest depth of paratypes by sex and size class as follows: *males*—(a) 40-49 mm SL, 28.8-42.6 (\bar{x} = 37.8, N = 12), (b) 50-69 mm SL, 35.6-44.5 (\bar{x} = 39.5, N = 20), (c) 70+ mm SL, 43.0 (N = 1); *females*—(a) 35-49 mm SL, 29.1-38.3 (\bar{x} = 33.8, N = 15), (b) 50-65 mm SL, 33.6-39.4 (\bar{x} = 35.5, N = 7); head length 28.8 (26.4-31.1); snout length 8.8 (6.7-9.1); eye diameter 8.9 (7.1-10.2); interorbital width 9.2 (8.0-11.9); caudal peduncle depth 12.8 (10.2-13.7); caudal peduncle length 13.2 (12.8-18.1); predorsal distance 56.1 (49.2-56.1); preanal distance 54.2 (50.7-58.4); prepelvic distance 42.1 (37.4-43.6).

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends opposite front border of eye or slightly beyond this level; lips thin; teeth conical with slightly curved tips, arranged in dense bands in upper and lower jaws; teeth at front of upper jaw in 4 or 5 irregular rows, reduced to 1 or 2 posteriorly; teeth of upper jaw and middle portion of lower jaw extending outside of mouth onto lip; teeth at front of lower jaw in about 6 to 8 irregular rows, tapering to 1-3 rows posteriorly; a narrow edentulous space at symphysis of lower jaw; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales relatively large, arranged in regular horizontal rows; most of body scales with crenulate margins; predorsal scales extending to posterior portion

of interorbital; preopercle scale rows from posterior angle to edge of eye 2 or 3.

First dorsal fin originates about opposite of anal fin origin; first dorsal spine 10.1 (9.1-10.7), its length is slightly (in females) to distinctly (in males) shorter than longest (usually 2nd or 3rd) spine; longest spine of first dorsal fin 11.6 (11.0-18.8), its tip reaching base of about 1st soft ray of second dorsal fin in females and 2nd to 4th soft ray in males when depressed. Spine of second dorsal fin 7.5 (7.2-9.6); longest (rays approximately uniform height in females, usually penultimate or last ray in males) soft ray of second dorsal fin 16.6 (10.1-18.3); depressed posterior rays of second dorsal fin extends back about $\frac{1}{2}$ length of caudal peduncle in females and to about caudal fin base in males. Anal fin spine 7.5 (7.1-8.1); longest anal rays 15.3 (10.7-15.5), most rays of uniform height. Soft dorsal and anal fin rectangular in outline, the posterior rays somewhat elongate and pointed, particularly in males. Pelvic fin tips when depressed not quite reaching base of anal spine in both males and females; length of pelvic fin 14.8 (12.5-19.3). Pectoral fins pointed, the length 20.8 (17.1-23.7). Caudal fin moderately forked, its length 21.1 (19.2-25.0).

Colour in alcohol: anterior one-half to two-thirds of body overall purplish-brown with lighter scale centres grading to silvery on ventral portion; posterior part of body yellowish or tan; some specimens with two or more diffuse bars of darker purple on lower half of anterior body region, the first of these generally faint and located just behind pectoral base, the last at middle of side; a series of faint red-brown stripes, one per scale row on sides, most noticeable on posterior half and very faint or absent in some specimens; first dorsal fin dusky brown, second dorsal fin mainly pale tan; caudal fin slightly dusky brown; and fin mostly pale tan with some duskiness anteriorly; pelvic fins dusky brown or purplish; pectoral fins translucent with some duskiness. Females have less contrast between the anterior and posterior body regions and the series of stripes on the sides are more apparent, even anteriorly.

Colour in life (from field notes), generally purplish or brown anteriorly and red-orange posteriorly.

Remarks

Melanotaenia boesemani is most closely related to *M. ajamaruensis*, a sympatric species. They do not appear to have close relatives elsewhere in the Australia-New Guinea region and may be confined to the Vogelkop Peninsula. They differ from all other *Melanotaenia* in colouration and by possessing a peculiar scale structure. The body scales are relatively tall compared with other members of the genus. The total horizontal scale row count ranges from 7 to 8, compared with 10 or more for most other *Melanotaenia*. Four Australian species, *M. exquisita* Allen (Northern Territory), *M. gracilis* Allen (Western Australia), *M. nigrans* (Richardson) (Northern Territory and Cape York Peninsula), and *M. pygmaea* Allen (Western Australia) also possess a low horizontal row count: the last named species usually has eight, occasionally nine

rows and the others usually nine or ten rows. However, these species are very different in colour pattern (see Allen, 1978) and are noticeably more slender. Mature males (in excess of 40 mm SL) have a body depth which averages 32.4% of SL (N = 17) for *M. pygmaea*, 26.3% of SL (N = 15) for *M. exquisita*, 29.6% of SL (N = 23) for *M. gracilis*, and 30.3% of SL (N = 34) for *M. nigrans*. By contrast specimens of *M. boesemani* rarely are less than 35% of SL and regularly attain depths of 40% of SL or more.

TABLE 1
Fin-ray counts for type specimens of
Melanotaenia boesemani

1st Dorsal fin spines			2nd Dorsal fin soft rays				
<i>IV</i>	<i>V</i>	<i>VI</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>
13	41	7	1	4	22	29	5
Anal fin soft rays			Pectoral fin rays				
<i>17</i>	<i>18</i>	<i>19</i>	<i>20</i>	<i>21</i>	<i>22</i>	<i>23</i>	<i>13</i>
2	9	18	19	8	3	2	1
							37
							18
							5

TABLE 2
Proportional measurements of selected type specimens of *Melanotaenia boesemani*
(expressed as a percentage of the standard length)

	Holotype		Paratypes			
	RMNH 28061	RMNH 28067	RMNH 28062	RMNH 28063	RMNH 28063	RMNH 28063
	male	male	male	female	female	female
Standard length (mm)	66.3	86.5	56.0	60.5	49.6	47.6
Depth	43.6	43.0	44.5	36.2	34.3	36.3
Head length	28.8	27.2	28.0	28.9	27.4	28.4
Snout length	8.8	7.9	7.7	8.3	7.9	8.2
Eye diameter	8.9	7.9	8.0	8.6	9.3	9.5
Bony interorbital width	9.2	10.2	10.2	8.9	9.1	9.2
Maxilla length	8.9	8.8	8.9	9.6	9.5	9.7
Depth of caudal peduncle	12.8	11.6	11.4	10.9	10.7	11.6
Length of caudal peduncle	13.2	16.0	16.4	17.0	15.9	16.6
Snout to 1st dorsal fin origin	56.1	52.5	52.3	54.0	51.8	54.6
Snout to anal fin origin	54.2	52.0	55.4	57.4	55.4	56.9
Snout to pelvic fin origin	42.1	38.4	39.1	41.8	41.3	43.1
Length of 1st dorsal fin base	7.7	7.6	9.1	8.9	9.1	9.9
Length of 2nd dorsal fin base	23.4	30.6	24.3	20.7	21.0	21.4
Length of anal fin base	36.6	40.7	37.9	32.7	31.7	32.8
Length of pectoral fin	20.8	18.5	20.7	18.7	19.8	20.2
Length of pelvic fin	14.8	12.8	13.9	12.7	12.9	16.6
Longest ray of 1st dorsal fin	11.6	13.9	15.9	12.1	14.1	13.7
Longest ray of 2nd dorsal fin	16.6	16.5	16.4	10.7	12.7	11.3
Longest anal ray	15.3	13.5	12.9	11.1	11.9	12.0
Length of caudal fin	21.1	23.1	22.3	22.0	22.5	25.0

Melanotaenia boesemani is readily separable from *M. ajamaruensis* on the basis of soft ray counts for the second dorsal and anal fins (see **Tables 1 and 3**). The former species has 10 to 14 (usually 12 or 13) dorsal rays and 17 to 23 (usually 18 to 21) anal rays compared with 15 to 19 (usually 15 to 17) and 21 to 27 (usually 22 to 24) for *M. ajamaruensis*. Although these species possess a similar colouration and general shape, the stripes on the sides tend to be more pronounced in *M. ajamaruensis*, particularly the mid-lateral one and the stripe just below it.

TABLE 3
Fin-ray counts for type specimens of
Melanotaenia ajamaruensis

1st Dorsal fin spines			2nd Dorsal fin soft rays				
IV	V	VI	15	16	17	18	19
4	30	13	10	25	9	1	2
Anal fin soft rays				Pectoral fin rays			
21	22	23	24	25	26	27	
2	9	23	10	1	1	1	
				13	14	15	
				3	32	12	

TABLE 4
Proportional measurements of selected type specimens of *Melanotaenia ajamaruensis*
(expressed as a percentage of the standard length)

	Holotype	Paratypes				
	RMNH 28068	RMNH 28069	RMNH 28069	WAM P26792-001	RMNH 28069	WAM P26792-001
	female	female	female	male	male	male
Standard length (mm)	78.0	63.7	56.9	67.7	62.0	56.9
Depth	39.2	35.8	36.9	40.1	39.9	36.9
Head length	26.1	27.3	28.8	27.0	26.6	28.8
Snout length	8.2	8.0	8.8	8.2	8.4	8.8
Eye diameter	7.7	8.3	9.1	7.8	7.7	9.1
Bony interorbital width	10.1	9.6	9.5	10.0	9.7	9.5
Maxilla length	9.4	9.4	9.7	10.0	9.2	9.7
Depth of caudal peduncle	11.0	11.1	11.2	11.5	11.5	11.2
Length of caudal peduncle	15.1	13.7	15.1	13.1	15.0	15.1
Snout to 1st dorsal fin origin	48.1	49.1	48.7	48.9	48.4	48.7
Snout to anal fin origin	53.7	53.1	54.5	52.9	51.8	54.5
Snout to pelvic fin origin	37.6	40.0	40.1	40.0	36.1	40.1
Length of 1st dorsal fin base	11.4	8.2	9.0	11.0	11.0	9.0
Length of 2nd dorsal fin base	28.0	28.0	27.4	29.2	26.1	27.4
Length of anal fin base	36.9	36.9	37.4	39.7	40.6	37.4
Length of pectoral fin	19.3	17.9	19.3	20.9	19.8	19.3
Length of pelvic fin	17.1	15.7	17.6	17.3	18.7	17.6
Longest ray of 1st dorsal fin	13.0	11.8	14.2	14.7	16.5	14.2
Longest ray of 2nd dorsal fin	13.5	12.4	11.2	15.4	16.3	11.2
Longest anal ray	11.4	12.7	13.7	14.0	13.5	13.7
Length of caudal fin	20.8	22.8	22.5	21.3	22.4	22.5

The types of *M. boesemani* and *M. ajamaruensis* were collected from the Ajamaru Lakes region which is located near the centre of the Vogelkop Peninsula at the western extremity of Irian Jaya (western New Guinea, see **Map 1**). The lakes are situated at the headwaters of the Ajamaru River which drains into the Kais River, eventually flowing into the Ceram Sea to the south. Several types were also collected at Aitinjo Lake, situated about 20 km south-east of the Ajamaru Lakes. Apparently it has a subterranean outlet connecting the Kais River. Boeseman (1963) gave further details about the areas from which the types were collected. He recorded elevations of 250 m and 90 m above sea level and a pH of 6.4-6.5 for the Ajamaru and Aitinjo locations respectively. It is possible that *M. boesemani* and *m. ajamaruensis* inhabit other areas on the Vogelkop Peninsula, but most of the region remains unsampled.

The gut contents of *M. boesemani* and *M. ajamaruensis* indicate a diet consisting mainly of small insects with lesser amounts of algae and crustaceans. Gonad development is apparent in female specimens of *M. boesemani* as small as 34 mm SL and they appear to be fully functional at 40-42 mm SL.

The species is named in honour of Dr Marinus Boeseman, Curator of Fishes at RMNH, and the collector of the type specimens. According to labels which accompany the types the native name for this species is 'sekiak' and it is also known as 'ikan rascado'.

Melanotaenia ajamaruensis sp. nov.

(Fig. 2)

Holotype

RMNH 28068, female, 78.0 mm SL, collected at Ajamaru Lakes, Vogelkop Peninsula, Irian Jaya, Indonesia (approximately 1°21'S, 132°16'E) by M. Boeseman on 4-6 March 1955.

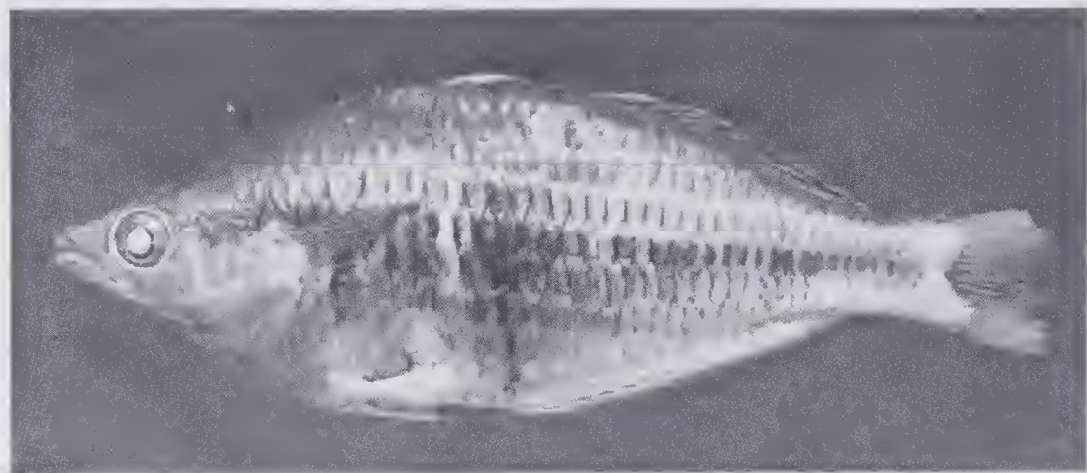


Fig. 2—*Melanotaenia ajamaruensis*, holotype, 78.0 mm SL.

Paratypes (same data as holotype)

LBN 2488, 4 specimens, 36.5-44.7 mm SL; RMNH 28069, 46 specimens, 25.5-63.7 mm SL; RMNH 28070, 6 specimens, 32.2-62.4 mm SL; RMNH 28071, 56.5 mm SL, USNM 220905, 3 specimens, 42.6-58.8 mm SL; WAM P26792-001, 6 specimens, 43.8-67.7 mm SL.

Diagnosis

A species of *Melanotaenia* with the following combination of characters: dorsal rays IV to VI, 15 to 19; anal rays I, 21 to 27; pectoral rays 13 to 15; horizontal scale rows 7 or 8; vertical scale rows 34 to 37; predorsal scales 13 to 16; preopercle scales 9 to 16; colour generally reddish-brown on back and anterior half of body grading to yellow or tan posteriorly with series of red-brown horizontal stripes on side, in life ground colour metallic blue to yellowish or green with yellow longitudinal stripes.

Description

Data for counts and measurements are based on the holotype and 28 paratypes, 42.5-67.0 mm SL.

Dorsal rays VI-I, 15 (IV to VI-I, 15 to 19); anal rays I, 22 (I, 21 to 27); pectoral rays 14 (13 to 15); horizontal scale rows 8 (7 or 8); vertical scale rows 36 (34 to 37); predorsal scales 16 (13 to 16) (\bar{x} = 15, N = 36); preopercle scales 13 (9 to 16) (\bar{x} = 13, N = 36); gill rakers on first arch 4 + 15 (2 to 4 + 14 or 15).

Greatest body depth 39.2, greatest depth of paratypes by sex and size class as follows: *males*—(a) 36-49 mm SL, 31.4-36.2 (\bar{x} = 34.3, N = 8), (b) 50-69 mm SL, 36.0-40.1 (\bar{x} = 38.0, N = 5); *females*—(a) 35-49 mm SL, 29.1-35.4 (\bar{x} = 32.9, N = 16), (b) 50-65 mm SL, 31.6-36.9 (\bar{x} = 33.5, N = 19); head length 26.1 (26.5-28.8); snout length 8.2 (7.6-9.2); eye diameter 7.7 (7.3-9.6); interorbital width 10.1 (8.6-11.2); caudal peduncle depth 11.0 (9.9-12.0); caudal peduncle length 15.1 (13.1-18.3); predorsal distance 48.1 (46.9-51.9); preanal distance 53.7 (50.9-57.3); prepelvic distance 37.6 (36.1-41.3).

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends opposite front border of eye or slightly beyond this level; lips thin; teeth conical with slightly curved tips, arranged in dense bands in upper and lower jaws; teeth at front of upper jaw in 4 or 5 irregular rows, reduced to 1 or 2 posteriorly; teeth of upper jaw and middle portion of lower jaw extending outside of mouth onto lip; teeth at front of lower jaw in about 6 to 8 irregular rows, tapering to 1-3 rows posteriorly; a narrow edentulous space at symphysis of lower jaw; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales relatively large, arranged in regular horizontal rows; most of body scales with slightly crenulate margins; predorsal scales extending to posterior portion of interorbital; preopercle scale rows from posterior angle to edge of eye 2 or 3.

First dorsal fin originates about one-half eye diameter in front of level of anal fin origin; first dorsal spine 9.1 (8.7-12.0); longest (3rd or 4th) spine of first dorsal fin 13.0 (10.9-16.9), its tip just reaching base of 2nd dorsal fin origin in females and base of 1st or 2nd soft ray of second dorsal fin in males when depressed. Spine of second dorsal fin 7.4 (7.2-10.4); longest (rays approximately uniform height in females, usually penultimate is longest in males) soft ray of second dorsal fin 13.5 (10.1-16.3); depressed posterior rays of second dorsal fin extends back about $\frac{1}{2}$ - $\frac{2}{3}$ length of caudal peduncle in females and nearly to caudal fin base in males. Anal fin spine 6.6 (6.2-8.7); longest (most rays of uniform height) anal rays 11.4 (9.6-14.1). Soft dorsal and anal fin rectangular in outline, the posterior rays somewhat elongate and pointed in males. Pelvic fin tips when depressed not reaching base of anal spine in females and extending to base of spine or 1st soft anal ray in males; length of pelvic fin 17.1 (15.1-19.1). Pectoral fins pointed, the length 19.3 (17.6-23.8). Caudal fin moderately forked, its length 20.8 (20.2-26.7).

Colour in alcohol: generally reddish-brown on back and anterior half of body grading to yellowish or tan posteriorly and silvery on abdomen and breast region (although scales in this area with dusky margins); series of red-brown horizontal stripes, one per scale row, and separated by pale lines, on sides, most prominent in females; mid-lateral stripe usually more distinct, slightly blackish in colour and continuing across opercle to rear edge of eye; 2 or 3 blackish vertical bars on lower half of sides near middle of body frequently present in adult males (in excess of about 60 mm SL); most of body scales with narrow dark outlines; first dorsal fin dusky brown; second dorsal fin mainly translucent with white margin and faintly blackish sub-marginal band; caudal fin slightly dusky brown; anal fin similar to second dorsal fin except it lacks white margin; pelvic and pectoral fins pale with dusky rays.

Colour in life (from field notes): ground metallic blue to yellowish or green with orange and yellow longitudinal stripes and dark scale edges.

Remarks

Morphological comparisons and ecological data are provided for this species under the remarks section for *M. boesemani*, its closest relative. It further differs from this species by being more slender (compare depth data in the descriptions), and by having the first dorsal fin origin in front (by about one-half eye diameter) of the anal fin origin compared to the approximately even position of these fins in *M. boesemani*.

Examination of the gonads of selected types indicates sexual maturity is attained between 40-45 mm SL.

The species is named *ajamaruensis* with reference to the Ajamaru Lakes, the type locality and only collection site for this species thus far. The local name for this species is 'sigak' according to field notes.

Melanotaenia japonensis sp. nov.
(Fig. 3)

Holotype

RMNH 28140, male, 76.8 mm SL, collected near Serui, Japen Island, Irian Jaya, Indonesia (approximately 1°54'S, 136°14'E) by M. Boeseman on 9 May 1955.

Paratypes

RMNH 28141, females, 2 specimens, 56.5 and 59.8 mm SL, collected with holotype.

Diagnosis

A species of *Melanotaenia* with the following combination of characters: dorsal rays IV or V-I, 15 to 17; anal rays I, 26 to 28; pectoral rays 13; horizontal scale rows 9; vertical scale rows 36 or 37; predorsal scales 16 or 17; preopercle scale rows 21 to 23; greatest body depth 32.6 to 37.9 percent of standard length; colour overall light brown to pale tan with a faint longitudinal band of brown along middle of side.

Description

Data for counts and measurements are based on the holotype and two paratypes.

Dorsal rays IV-I, 16 (IV and V-I, 15 and 17); anal rays I, 26 (I, 26 and 28); pectoral rays 13; horizontal scale rows 9; vertical scale rows 36 (36 and 37);



Fig. 3—*Melanotaenia japonensis*, holotype, 76.8 mm SL.

predorsal scales 16 (16 and 17); preopercle scales 22 (21 and 23); gill rakers on first arch 2 + 14 (2 + 13).

Greatest body depth 37.9 (32.6 and 33.6); head length 27.1 (27.8 and 27.9); snout length 8.3 (8.7 and 9.5); eye diameter 6.9 (8.4 and 8.5); interorbital width 9.1 (8.4 and 9.4); caudal peduncle depth 13.3 (11.5 and 12.0); caudal peduncle length 11.1 (14.2 and 14.3); predorsal distance 49.2 (48.5 and 49.4); preanal distance 49.6 (49.2 and 53.7); prepelvic distance 40.1 (40.5 and 42.5).

Jaws oblique, nearly equal, upper protruding slightly, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla extends slightly beyond level of front border of eye; lips thin; teeth conical with slightly curved tips, arranged in dense bands in upper and lower jaws; teeth at front of upper jaw in 5 to 7 irregular rows, reduced to 1 to 3 rows posteriorly, where they are most stout; teeth covering a substantial portion of lips outside mouth, particularly on upper jaw; teeth at front of lower jaw in about 5 or 6 irregular rows, tapering to 1 or 2 rows posteriorly; narrow edentulous space lacking at symphysis of lower jaw; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales relatively large, arranged in regular horizontal rows; most of body smooth or scales with slightly crenulate margins; predorsal scales extending to posterior portion of interorbital; preopercle scale rows from posterior angle to edge of eye 4 or 5.

First dorsal fin originates opposite anal fin origin or slightly behind this point; first dorsal spine 8.3 (8.0 and 8.4), its length is slightly (in females) to distinctly (in males) shorter than longest (usually 2nd or 3rd) spine; longest spine of first dorsal fin 13.4 (10.1 and 10.2), its tip reaching base of spine at beginning of second dorsal fin in females and 2nd soft ray in male holotype when depressed. Spine of second dorsal fin 8.1 (8.4 and 9.2); longest (6-8th in females, last or penultimate in male) soft ray of second dorsal fin 12.4 (12.7 and 13.5); depressed posterior rays of second dorsal fin extends back about $\frac{1}{2}$ - $\frac{2}{3}$ length of caudal peduncle in females and to caudal fin base in males. Anal fin spine 7.2 (7.6 and missing); longest (about 10th to 20th) anal rays 13.3 (11.4 and 12.0). Soft dorsal and anal fin rectangular in outline, the posterior rays somewhat elongate and pointed in males. Pelvic fin tips when depressed reaching to about base of anal spine in females and extending to base of 1st or 2nd soft anal ray in male; length of pelvic fin 14.2 (13.2 and 13.8). Pectoral fins pointed, the length 18.2 (15.6 and 17.7). Caudal fin damaged in all types, but probably slightly forked.

Colour in alcohol: overall light brown to pale tan, slightly lighter along ventralmost portion of head and body; dusky brown scale outlines on upper half of sides, most evident in female paratypes; a faint longitudinal band of brown nearly one scale wide along middle of sides, scarcely evident under pectoral fins, becoming most prominent on posterior half of body; fins white to dusky.

Remarks

Melanotaenia japonensis is clearly derived from the same phyletic line which includes *m. affinis* (Weber) and *M. vanheurni* (Weber & de Beaufort) of northern New Guinea. These species possess similar colour patterns and have dorsal and anal soft fin ray counts which are relatively high for the genus. However, *M. japonensis* differs from *M. affinis* by having a higher anal ray count (26-28 vs. 18-24, 41 specimens of *affinis* counted), and from *M. vanheurni* by having fewer soft dorsal rays (15-17 vs. 18-21 usually 19, 29 specimens of *vanheurni* counted). In addition, the male holotype of *M. japonensis* has a deeper body (37.9% of SL) compared to similar sized males of *M. vanheurni* (average 30.7% of SL for 4 specimens, 75-89 mm SL).

Melanotaenia japonensis is apparently restricted to Japen, a long (approximately 160 km), narrow island situated in the gulf (Teluk Sarera) on the north coast of Irian Jaya which isolates the Vogelkop Peninsula from the remainder of New Guinea (see **Map 1**). The island represents a continuation of a coastal mountain chain found on the nearby (30 km distance) New Guinea mainland and has a maximum elevation of 1500 m. Presumably speciation of *M. japonensis* has occurred in relatively recent times as a result of the separation of Japen from the mainland due to a post pleistocene rise in sea level.

Both paratypes contain ripe eggs.

This species is named *japonensis* with reference to the type locality.

Melanotaenia oktediensis sp. nov.

(Fig. 4)

Melanotaenia cf. *vanheurni* (non Weber & de Beaufort), Roberts, 1978: 48, Fig. 26b.

Holotype

USNM 217127, female, 73.5 mm SL, collected with rotenone from lower portion of Karamonge Creek, a tributary of the Ok Tedi, Fly River System, 32 km NNE of Ningerum, Papua New Guinea (approximately 5°26.6'S, 141°17.4'E), by T. Roberts, 1 November 1975.

Paratypes

PNG F.4214-02, females, 2 specimens, 85.5 and 99.0 mm SL, collected in the Ok Tedi River at Tabubil, Papua New Guinea (approximately 5°17'S, 141°13'E), by C. Boyden, 5-22 July 1974.

Diagnosis

A species of *Melanotaenia* with the following combination of characters:



Fig. 4—*Melanotaenia oktediensis*, holotype, 73.5 mm SL.

dorsal rays V or VI-I, 18 or 19; anal rays I, 24 to 26; pectoral rays 14 or 15; horizontal scale rows 11; vertical scale rows 36 to 39; predorsal scales 13 to 15; preopercle scales 15 to 22; colour brown on upper half of body and white on lower portion, prominent black mid-lateral stripe along middle of side; five horizontal scale rows between first dorsal fin origin and black mid-lateral stripe.

Description

Data for counts and measurements are based on the holotype and two paratypes.

Dorsal rays VI-I, 19 (V-I, 19 and VI-I, 18); anal rays I, 26 (I, 24); pectoral rays 15 (14 and 15); horizontal scale rows 11; vertical scale rows 39 (36 and 37); predorsal scales 14 (13 and 15); preopercle scales 15 (21 and 22); gill rakers on first arch 2 + 15.

Greatest body depth 28.6 (33.3 and 33.9); head length 26.5 (26.9 and 27.5); snout length 8.2 (8.2 and 8.3); eye diameter 9.3 (7.3 and 8.2); interorbital width 9.5 (9.6 and 9.9); caudal peduncle depth 9.8 (10.9 and 11.2); caudal peduncle length 19.0 (15.8 and 16.7); predorsal distance 42.6 (41.0 and 45.0); preanal distance 49.3 (51.6 and 52.7); prepelvic distance 38.1 (40.0 and 40.1).

Jaws oblique, nearly equal, upper protruding slightly, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla extends slightly beyond level of front border of eye; lips thin; teeth conical with slightly curved tips, arranged in dense bands in upper and lower jaws; teeth at front of upper jaw in 4 or 5 irregular rows, reduced to 1 or 2 rows posteriorly; teeth covering a substantial portion of lips outside mouth, particularly on upper jaw; teeth at front of lower jaw in about 6 to 8 irregular rows, tapering to 1 or 2 rows posteriorly; a narrow edentulous space at symphysis of lower jaw; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales relatively large, arranged in regular horizontal rows; most of body

scales smooth or with slightly crenulate margins; predorsal scales extending to posterior portion of interorbital; preopercle scale rows from posterior angle to edge of eye 2 or 3.

First dorsal fin originates about $\frac{1}{2}$ to one full eye diameter ahead of level of anal fin origin; first dorsal spine 9.7 (8.6 and 9.6); longest spine (3rd) of first dorsal fin 14.4 (13.0 and 14.4), its tip reaching base of 1st or 2nd soft ray of second dorsal fin in female types when depressed. Spine of second dorsal fin 9.4 (7.6 and 9.4); soft rays of second dorsal fin about equal in length, anterior rays slightly longer, 11.8 (10.3 and 12.0); depressed posterior rays of second dorsal fin extends to about middle length of caudal peduncle in female types. Anal fin spine 6.5 (5.6 and 7.4); soft anal fin rays about equal in length, longest 11.6 (9.6 and 11.1). Soft dorsal and anal fin rectangular in outline. Pelvic fin tips when depressed not reaching base of anal spine in paratypes and extending to base of 1st soft anal ray in holotype; length of pelvic fin 15.0 (15.2). Pectoral fins pointed, the length 20.4 (16.2 and 18.7). Caudal fin moderately forked, its length 21.9 (21.4 and 22.8).

Colour in alcohol: brown on upper half of body with dusky scale outlines, white or pale yellow on lower portion; prominent black longitudinal band along middle of sides extending from pectoral region to caudal fin base, about 2 scales wide; operculum dusky brown, dotted with numerous chromatophores; dorsal fins dusky brown, slightly darker on outer edge; caudal fin dusky suffused with yellowish; anal fin primarily whitish with outer edge dusky brown; pelvic and pectoral fins translucent. The paratypes are generally lighter than the holotype, perhaps because of their longer preservation.

Remarks

Melanotaenia oktediensis appears to be closely related to *M. vanheurni* from the Mamberamo basin in northern New Guinea. Both species have a relatively elongate body shape (although the males of *oktediensis* are unknown), a prominent mid-lateral black band, and are characterised by relatively numerous soft dorsal and anal fin rays. The most significant difference is the position of the mid-lateral stripe, which is lower on the side in *M. oktediensis*. The stripe in this species is positioned at a level which is even with the middle of the pectoral fin base and there are five horizontal scale rows between the stripe and first dorsal fin origin. In *M. vanheurni* the stripe is level with the uppermost portion of the pectoral fin base and there are 3-3½ scale rows between it and the dorsal fin origin. Moreover, the stripe of *M. vanheurni* is usually bordered above, at least posteriorly, by a narrow pale stripe, a feature which is lacking in *M. oktediensis*. Also in *vanheurni* the stripe continues uninterrupted to the eye, whereas in *m. oktediensis* it commences about one eye diameter behind the pectoral fin base. Comparisons were made with 86 specimens of *M. vanheurni* deposited at the Zoologisch Museum, Amsterdam (ZMA) and the American Museum of Natural History, New York (AMNH).

Roberts (1978) reported that the holotype was collected at an altitude of approximately 450 m in water which was clear to slightly turbid. The type locality lies 934 km upstream from Toro Pass at the mouth of the Fly River (see Map 1).

Ripe eggs were present in all type specimens. The gut contents indicate a diet consisting mainly of small insects.

The species is named *oktediensis* with reference to the Ok Tedi River system, the only locality from which it has been collected.

Glossolepis pseudoincisis sp. nov.

(Fig. 5)

Holotype

RMNH 28072, male, 75.7 mm SL, collected from ox-bow lake next to Tami River, 23 km SE of Jayapura, Irian Jaya, Indonesia (approximately 2°42'S, 140°55'E) by M. Boeseman on 19-21 November 1954.

Paratypes (collected with holotype)

LBN 2489, 4 specimens, 41.3-63.9 mm SL; RMNH 28073, 41 specimens, 33.1-78.5 mm SL; USNM 220907, 4 specimens, 48.0-67.4 mm SL; WAM P26793-001, 5 specimens, 60.2-76.9 mm SL.

Diagnosis

A species of *Glossolepis* with the following combination of characters: dorsal rays V or VI-I, 10 to 12; anal rays I, 18 to 22; pectoral rays 13 or 14; horizontal scale rows 12 to 16; vertical scale rows 38 to 43; predorsal scales 27 to 34;

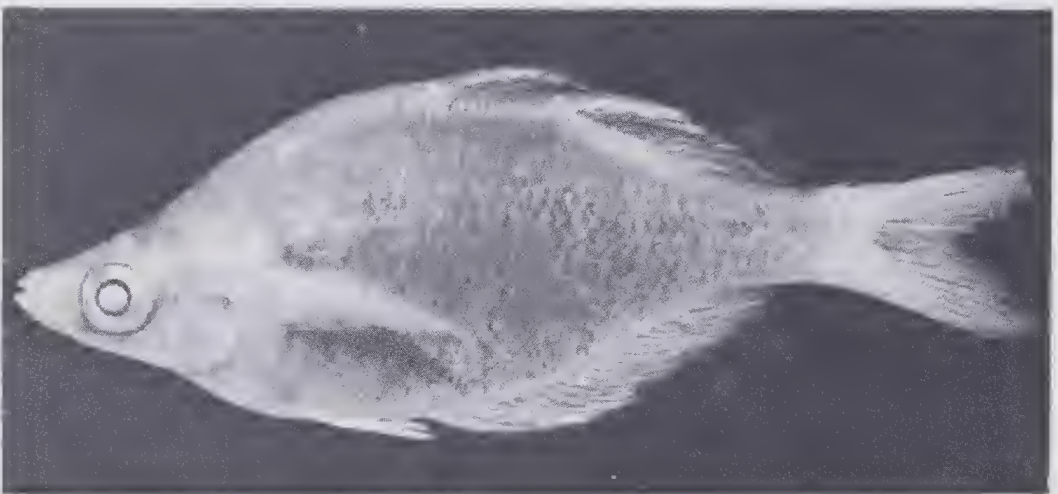


Fig. 5—*Glossolepis pseudoincisis*, holotype, 75.7 mm SL.

preopercle scales 21 to 29; gill rakers on first arch 6 to 9 + 26 to 30; predorsal distance greater than preanal distance; colour generally brown, darker on upper sides with silvery sheen on lower half of side and head; pectoral and pelvic fins pale.

Description

Data for counts and measurements are based on the holotype and 20 paratypes, 58.8-78.5 mm SL.

Dorsal rays V-I, 10 (V or VI-I, 10 to 12); anal rays I, 21 (I, 18 to 22); pectoral rays 14 (13 or 14); horizontal scale rows 15 (12 to 16); vertical scale rows 40 (38 to 43); predorsal scales 32 (27 to 34) (\bar{x} = 31, N = 39); preopercle scales 26 (21 to 29) (\bar{x} = 25, N = 39); gill rakers on first arch 6 + 28 (6 to 9 + 26 to 30).

Greatest body depth 41.0, greatest depth of paratypes by sex and size class as follows: *males*—(a) 46-49 mm SL, 31.9-32.6 (\bar{x} = 32.1, N = 3), (b) 50-69 mm SL, 33.5-43.0 (\bar{x} = 38.0, N = 12), (c) 70+ mm SL, 36.7-40.8 (\bar{x} = 38.9, N = 5); *females*—(a) 47-49 mm SL, 31.9-35.4 (\bar{x} = 33.2, N = 4), (b) 50-69 mm SL, 31.4-38.3 (\bar{x} = 34.8, N = 11), (c) 70+ mm SL, 36.3 (N = 1); head length 28.5 (27.7-30.5); snout length 8.7 (7.6-9.4); eye diameter 9.6 (9.7-11.0); interorbital width 9.0 (8.9-10.6); caudal peduncle depth 10.8 (10.2-11.9); caudal peduncle length 18.0 (16.1-19.5); predorsal distance 54.8 (51.3-56.3); preanal distance 50.2 (48.7-53.4); prepelvic distance 35.9 (34.3-38.1).

Jaws about equal, oblique, premaxilla with an abrupt bend between the anterior horizontal portion and lateral part; maxilla ends well in front of anterior border of eye; lips thin; teeth conical with slightly curved tips, those in outer row stouter; teeth in upper jaw arranged in about 2 or 4 irregular rows anteriorly, reduced to a single row posteriorly, where they are most stout and extend outside the mouth onto the lip; about 35-50 teeth in outer row of upper jaw; teeth at front of lower jaw in about 5 rows reduced to a single row posteriorly, outer row consisting of 4 to 8 strong curved teeth on each side of symphysis; no edentulous space between outer row teeth and those inside; a narrow edentulous space at symphysis of lower jaw; several rows of small, conical teeth on vomer; palatines with a narrow band of similar teeth.

Scales moderate sized, arranged in regular horizontal rows; most of body scales with strongly crenulate margins; predorsal scales extending to posterior portion of interorbital; preopercle scale rows from posterior angle to edge of eye 3 or 4.

First dorsal fin originates opposite anal fin origin or slightly behind this level; first dorsal spine 14.7 (14.5-17.8), its length is slightly greater (in females) to slightly shorter (in males) than longest (usually 2nd or 3rd) spine; longest spine of first dorsal fin 16.5 (13.0-16.9), its tip reaching base of 2nd dorsal fin origin or slightly beyond this level when depressed. Spine of second dorsal fin 16.0 (12.2-21.5); longest (1st in females, about 4th to 8th in males) soft ray of second dorsal fin 14.5 (12.7-19.3); depressed posterior rays of second

dorsal fin extends back to middle of caudal peduncle in females and about $\frac{2}{3}$ - $\frac{3}{4}$ length of caudal peduncle in mature males. Anal fin spine 9.8 (9.1-12.2); longest (about 4th to 8th) anal rays 15.9 (13.8-17.0). Soft dorsal and anal fin rectangular in outline. Pelvic fin tips when depressed reaching base of anal spine in females and extending slightly beyond this level in males; length of pelvic fin 17.8 (15.2-18.0). Pectoral fins pointed, the length 26.2 (21.5-26.4). Caudal fin moderately forked, its length 25.8 (26.1-28.7).

Colour in alcohol: generally brown, darker on upper sides, lower half of sides and most of head with silvery sheen; dorsal and anal fins dusky brown with translucent rays; caudal fin pale tan with slight duskiness; pectoral and pelvic fins translucent.

Remarks

Allen & Kailola (1979) discussed the taxonomy of *Glossolepis* and provided a key to the three species contained in this genus: *G. incisus* Weber, *G. multisquamatus* (Weber & de Beaufort), and *G. wanamensis* Allen & Kailola. These fishes differ from other melanotaeniids by a combination of characters which includes distinctly crenulate scale margins, a high gill raker count, spine at the beginning of the second dorsal fin taller than first spine of first dorsal fin, relatively elongate pectoral fins, a unique premaxillary dentition and characteristic profile of the head, nape, and dorsal and anal fins.

TABLE 5
Fin-ray counts for type specimens of
Glossolepis pseudoincisus

1st Dorsal fin spines					2nd Dorsal fin soft rays		
V	VI				10	11	12
15	25				22	16	2
Anal fin soft rays					Pectoral fin rays		
18	19	20	21	22	13	14	
1	4	9	20	6	18	22	

TABLE 6
Comparison of certain characters for
Glossolepis pseudoincisus and *G. incisus*

Character	<i>G. pseudoincisus</i>	<i>G. incisus</i>
Horizontal scale rows	12-16	16-20
Vertical scale rows	38-43	50-60
Predorsal scales	27-34 (\bar{x} = 31, N = 39)	30-36 (\bar{x} = 36, N = 13)
Preopercle scales	21-29 (\bar{x} = 25, N = 39)	26-38 (\bar{x} = 31, N = 13)
Predorsal-Preanal distance	Predorsal > Preanal	Predorsal < Preanal
Pectoral fin colour	uniformly pale	outer portion dusky brown
Pelvic fin colour	mainly pale	mainly dusky brown

The four members of the genus are restricted to northern New Guinea. All except *G. multisquamatus*, from the Sepik and Mamberamo Rivers, appear to have extremely limited distributions. *Glossolepis incisus* is known only from Lake Sentani, which lies approximately 30 km west of the single collection site for *G. pseudoincisus*, and *G. wanamensis* is known only from Lake Wanam, near Lae, Papua New Guinea. *Glossolepis pseudoincisus* is most closely allied to *G. incisus*. They differ from the other members of the genus by possessing more gill rakers on the first arch (26-32 *vs.* 19-23) and by having more pronounced crenulations on the scale margins. These species differ from one another on the basis of the characters presented in **Table 6** below.

Boeseman (1963) gave a detailed description of the type locality (see **Map 1**) in the Tami River region near Hollandia (now Jayapura). The site represents an isolated ox-bow lake of the Tami River with an estimated width of 35-40 m and uncertain depth. The lake is surrounded by heavy rainforest and steep banks. At the time of collection the bottom was muddy with areas of dense aquatic vegetation.

TABLE 7

Proportional measurements of selected type specimens of *Glossolepis pseudoincisus*
(expressed as a percentage of the standard length)

	Holotype		Paratypes			
	RMNH 28072	RMNH 28073	WAM P26793-001	RMNH 28073	RMNH 28073	RMNH 28073
	male	male	male	female	female	female
Standard length (mm)	75.7	78.5	64.0	71.8	66.0	59.0
Depth	41.0	37.6	43.3	37.2	37.3	35.4
Head length	28.5	28.8	29.7	29.9	29.5	29.7
Snout length	8.7	8.5	7.8	8.4	8.5	8.1
Eye diameter	9.6	9.7	11.1	10.9	10.3	11.2
Bony interorbital width	9.0	9.6	9.8	9.7	9.5	9.3
Maxilla length	7.3	7.1	7.2	7.7	7.6	7.8
Depth of caudal peduncle	10.8	10.6	11.7	10.9	11.1	10.8
Length of caudal peduncle	18.0	18.0	16.6	18.7	17.1	16.9
Snout to 1st dorsal fin origin	54.8	54.8	53.6	54.7	52.3	54.2
Snout to anal fin origin	50.2	50.1	51.9	52.2	51.5	53.4
Snout to pelvic fin origin	35.9	36.3	35.6	37.6	36.1	37.8
Length of 1st dorsal fin base	10.0	9.9	13.0	9.7	10.6	11.0
Length of 2nd dorsal fin base	18.6	18.1	20.0	19.1	18.8	20.0
Length of anal fin base	38.6	37.5	39.8	36.6	36.8	37.6
Length of pectoral fin	26.2	24.8	25.2	22.8	23.2	23.4
Length of pelvic fin	17.8	17.6	17.5	15.5	15.2	15.6
Longest ray of 1st dorsal fin	16.5	15.9	16.4	15.2	15.2	15.3
Longest ray of 2nd dorsal fin	14.5	14.5	13.9	16.3	16.8	18.8
Longest anal ray	15.9	16.3	16.1	14.5	14.2	14.6
Length of caudal fin	25.8	26.8	28.1	26.5	27.3	21.2*

*damaged

The gut contents of the types indicate a diet consisting mainly of small insects (such as ants) with lesser amounts of tiny crustaceans and algae. The gonads were poorly preserved and it was therefore difficult to determine the minimum size at maturation. The smallest ripe female examined was 47 mm SL.

The species is named *pseudoinciscus* with reference to its similar appearance and geographic proximity to *Glossolepis incisus*.

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We are greatly indebted to Dr M. Boeseman of RMNH for the loan of his valuable collections from Irian Jaya which formed the basis of this study. We also thank Dr L. Knapp of USNM and Dr T. Roberts of the Tiburon (California) Center for Environmental Studies for providing the holotype of *M. oktediensis*, and Mr B. Smith of PNG for the paratypes of this species. Dr H. Nijssen of ZMA and Dr D. Rosen of AMNH sent loans of specimens used for comparisons. Finally, we thank Mrs C. Allen for her careful preparation of the typescript.

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